

Hotel Valuation Techniques

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IN THIS CHAPTER, we provide a thorough overview of lodging valuation models. Hotel valuation, like all real estate valuation, must be seen in the context of establishing a point estimate that represents the value of a unique, illiquid asset in an environment with noisy and conflicting information. This gives rise to the use of multiple approaches that must be reconciled.

Appraisers are charged with estimating *market value*¹ using the classic trioka of the cost approach, the sales comparison approach, and the income approach. Appraisers use "market" indicators of return requirements and other valuation parameters to produce their estimates. Investors, on the other hand, wish to estimate *investment value*,² which includes the effects of income taxes, the investor's unique cost of capital, and other investor-specific conditions. Investors typically rely on a modified income approach tailored to their circumstances, augmented with recent transaction information, to estimate value and form their bidding strategy.

Three Approaches to Hotel Valuation

In valuing hotels, there are three approaches from which to select: the income capitalization, sales comparison, and cost approach. Although all three valuation approaches are generally given consideration, the inherent strengths of each approach and the nature of the hotel in question must be evaluated to determine which approach will provide supportable value estimates. In addition, there is a set of rules of thumb that are used to provide a rough estimate of value. Since hotel investors typically give more weight to it, the income capitalization approach will be emphasized in this chapter.

In jurisdictions where *ad valorem* taxes are based on market value of real estate, hotel owners are concerned with separately estimating the real property component (real estate) and the personal property component (both tangible and intangible personal property).

Income Capitalization Approach

The income capitalization approach is based on the principle that the value of a property is indicated by its net return, or what is known as the "present worth of future benefits." The future benefits of income-producing properties, such as hotels, are the net income estimated by a forecast of income and expense along with the anticipated proceeds from a future sale. These benefits can be converted into an indication of market value through a capitalization process and discounted cash flow analysis.

The forecast of income and expense is expressed in nominal or inflation-adjusted dollars for each of three years. The stabilized year is intended to reflect the anticipated operating results of the property over its remaining economic life, given any or all applicable stages of build-up, plateau, and decline in the life cycle of a hotel. Thus, income and expense estimates from the stabilized year forward exclude from consideration any abnormal relationship between supply and demand, as well as any nonrecurring conditions that may result in unusual revenues or expenses.

As stated in the textbook entitled *Hotels and Motels: Valuations and Market Studies*, "Of the three valuation approaches available to the appraiser, the income capitalization approach generally provides the most persuasive and supportable conclusions when valuing a lodging facility."³ The text goes on to state that using a ten-year forecast and an equity yield rate "most accurately reflects the actions of typical hotel buyers, who purchase properties based on their leveraged discounted cash flow."⁴ The simpler procedure of using a ten-year forecast and a discount rate (total property yield) is "less reliable because the derivation of the discount rate has little support. Moreover, it is difficult to adjust the discount rate for changes in the cost of capital."⁵ Because of this difficulty, the procedure is not illustrated in this chapter. A third income valuation technique is the "band of investment using one stabilized year." This technique is appropriate when the local hotel market is not expected to experience any significant changes in supply and demand, so it can be assumed that the subject property's net income has stabilized.

Sales Comparison Approach

While hotel investors are interested in the information contained in the sales comparison approach, they usually do not employ this approach in reaching their final purchase decisions. Factors such as the lack of recent sales data, the numerous insupportable adjustments that are necessary, and the general inability to determine the true financial terms and human motivations of comparable transactions often make the results of this technique questionable. The sales comparison approach is most useful in providing a range of values indicated by prior sales and in establishing an indicator of pricing momentum; however, reliance on this method beyond the establishment of broad parameters is rarely justified by the quality of the sales data. The market-derived capitalization rates sometimes used by appraisers are susceptible to the same shortcomings inherent in the sales comparison approach.

Cost Approach

The cost approach may provide a reliable estimate of value in the case of new properties, but as buildings and other improvements grow older and begin to deteriorate, the resultant loss in value becomes increasingly difficult to quantify accurately. Most knowledgeable hotel buyers base their purchase decisions on economic factors such as projected net income and return on investment. Because the cost approach does not reflect these income-related considerations and requires a number of highly subjective deprecation estimates, this approach is given minimal weight in the hotel valuation process. However, it is useful in establishing a benchmark for buy versus build decisions and for relative pricing over time.

Valuation for Assessment Purposes

The question arises of whether to separately estimate a hotel's real property and personal property components in the interest of reducing the tax burden on the property. Such a practice it is hoped would not only reduce property taxes, but take advantage of much shorter depreciation periods for goodwill as opposed to real property. There is no question that some portion of cash flows generated by a hotel must be used to support the unique characteristics of the hotel investment, such as large continuing investment in furniture, fixtures, and equipment (FF&E) and the need to employ specialized management to realize a property's potential. However, because there is a significant financial incentive to attribute a portion of the going-concern value to intangible personal property, valuation of the intangible property component of a hotel is contentious.⁶

Valuation of the real property and personal property components generally proceeds by establishing the overall net income before any deductions for property taxes, FF&E funding, management fees, and franchise fees. Deductions are made for income attributable to the business or going concern and tangible personal property, leaving what is generally called "net income" attributable to the real estate. This remainder is capitalized at a capitalization rate to establish the value of the real estate component.

We focus our discussion in this chapter on three valuation techniques and three income approaches to estimate a hotel's value. Within the income approaches we present two variants of the traditional mortgage-equity model that estimates the market value of individual hotels: (1) an after-tax model that estimates investment value, and (2) an income capitalization technique used to value hotels owned by publicly traded lodging companies. In addition, two alternatives for the sales comparison approach and the cost approach will be considered. Finally, we explore separately the valuing of the real property component of a hotel asset. We conclude with a discussion of all of the techniques. Each method is illustrated by a unified case study that allows for meaningful comparison of the techniques.

Case Study Example and Valuation Techniques

The Major City Edgemore Hotel is a 250-room upscale property in an urban market catering to the needs of business travelers and moderate-size groups. The property is part of the large national franchise network of Edgemore Hotels. The Edgemore was constructed in 1995 in a growing area of Major City, located in the southern half of the United States. The property has a restaurant and deli with 180 seats, and a club and lobby bar with 90 combined seats. Meeting space totals 15,000 square feet and includes a grand ballroom, two executive boardrooms, several breakout rooms, and a business center. Recreational facilities include an indoor/outdoor pool with whirlpool and an adjoining fitness center with locker facilities. The property was constructed using superior materials and workmanship and has been maintained in average to above-average condition. The property was recently renovated and shows no signs of distress or deferred maintenance.

We assume the current date to be January 1, 2004. The Edgemore has traditionally been an above-average competitor, achieving average daily rates virtually in the middle of its competitive set and above-average occupancy. The property consistently achieves 105 percent RevPAR penetration. The Edgemore achieved solid occupancy and average daily rates during the 1996-2000 period, but suffered after the events of September 11, 2001. In addition, one new hotel and a conversion from a mid-price to upscale hotel opened in 2002, increasing the number of rooms in the upscale sub-market by 20 percent. These factors combined to produce a significant drop in market occupancy as the new properties gained their fair share of the upscale market. The occupancy situation is expected to improve rapidly, with no new supply in the pipeline and with demand expected to grow quickly over the next three years.

Pro-Forma Financial Projections

Exhibit 1 presents a historical statement of the Edgemont Hotel's income and expense for 2003, as well as projections for 2004 through 2008. The current date is assumed to be January 1, 2004. The projections account for an increase in the room demand and changes in the relative competitive position of the Edgemore. The operating expenses for the property include all charges normally associated with the operation of the property, including franchise and royalty fees, a management

Exhibit 1 Statement of Revenues and Expenses for the 250-Room Major City Edgemore Hotel

	2003 - Historical			2004 - Year 1			2005 - Year 2			2006 - Year 3			2007 - Year 4			2008 - Year 5		
	Occupancy			Average Rate			Rooms Occupied			Occupancy			Average Rate			Rooms Occupied		
	% of \$(000)	\$ per Gross	\$ per Room	% of \$(000)	\$ per Gross	\$ per Room	% of \$(000)	\$ per Gross	\$ per Room	% of \$(000)	\$ per Gross	\$ per Room	% of \$(000)	\$ per Gross	\$ per Room	% of \$(000)	\$ per Gross	\$ per Room
Occupancy	59%			63%			67%			71%			72%			70%		
Average Rate	\$166.64			\$171.64			\$176.79			\$182.09			\$187.56			\$193.18		
Rooms Occupied	53,838			57,488			61,138			64,788			64,700			63,875		
Total Revenues	12,591	100.0	50,364	13,769	100.0	55,076	15,005	100.0	60,020	16,306	100.0	65,224	17,014	100.0	68,056	17,074	100.0	68,296
Departmental Expenses	<u>4,939</u>	<u>39.2</u>	<u>19,756</u>	<u>5,197</u>	<u>37.7</u>	<u>20,788</u>	<u>5,465</u>	<u>36.4</u>	<u>21,860</u>	<u>5,746</u>	<u>35.2</u>	<u>22,984</u>	<u>5,948</u>	<u>35.0</u>	<u>23,792</u>	<u>6,065</u>	<u>35.5</u>	<u>24,260</u>
Departmental Income	7,652	60.8	30,608	8,572	62.3	34,288	9,540	63.6	38,160	10,560	64.8	42,240	11,066	65.0	44,264	11,009	64.5	44,036
Undistributed Operating Expenses	<u>3,915</u>	<u>31.1</u>	<u>15,660</u>	<u>4,116</u>	<u>29.9</u>	<u>16,464</u>	<u>4,326</u>	<u>28.8</u>	<u>17,304</u>	<u>4,547</u>	<u>27.9</u>	<u>18,188</u>	<u>4,706</u>	<u>27.7</u>	<u>18,824</u>	<u>4,799</u>	<u>28.1</u>	<u>19,196</u>
Income Before Fixed Charges	3,737	29.7	14,948	4,456	32.4	17,824	5,214	34.7	20,856	6,013	36.9	24,052	6,360	37.4	25,440	6,210	36.4	24,840
Fixed Charges	<u>1,354</u>	<u>10.8</u>	<u>5,416</u>	<u>1,449</u>	<u>10.5</u>	<u>5,796</u>	<u>1,550</u>	<u>10.3</u>	<u>6,200</u>	<u>1,656</u>	<u>10.2</u>	<u>6,624</u>	<u>1,722</u>	<u>10.1</u>	<u>6,888</u>	<u>1,742</u>	<u>10.2</u>	<u>6,968</u>
Net Income	<u>2,383</u>	<u>18.9</u>	<u>9,532</u>	<u>3,007</u>	<u>21.8</u>	<u>12,028</u>	<u>3,664</u>	<u>24.4</u>	<u>14,656</u>	<u>4,357</u>	<u>26.7</u>	<u>17,428</u>	<u>4,638</u>	<u>27.3</u>	<u>18,552</u>	<u>4,468</u>	<u>26.2</u>	<u>17,872</u>

Notes:

- Total Revenues includes Rooms, Food & Beverage, Telephone, and "Other" revenues.
- Departmental Expenses includes the direct expenses of Rooms, Food & Beverage, Telephone, and "Other."
- Undistributed Operating Expenses includes A&G, Marketing, Franchise Fees, Property Operation and Maintenance, and Energy Costs.
- Fixed Charges includes Property Taxes, Insurance, Management Fees, and a 4 percent Capital Expenditure (CapEX) Reserve.

fee, and a capital expenditure (CapEx) reserve. Thus, the net income figure represents the cash available to service debt, provide an equity dividend, and pay income taxes.

The projection shows a rapid decline in occupancy as new supply comes into the market, with average daily rate increasing with inflation over the projection period. This combination produces a net income that increases rapidly and then peaks in 2007. The year 2003 obtains a net income of \$2.38 million, while the third projection year of 2007 obtains a net income of \$4.64 million, an increase of 94.6 percent over the three years. Both projection years are inappropriate for use as an estimate of stabilized net income, with the 2004 figure being too small and the 2007 figure too large. It is thought that long-term stabilized occupancy will average 71 percent. Hence, a stabilized net income of \$4.107 million is used.⁷

Basis of Projections. Room rates are projected to increase by 3 percent for all years. All other revenues and expenses are projected to increase by 3 percent per year. Other assumptions used in the valuation techniques are:

Debt Parameters

Loan-to-Value Ratio ⁸	60%
Amortization	25 years
Mortgage Interest	8.75%
Yearly Mortgage Constant ⁹	0.098657
Percent of Loan Paid in 10 Years ⁹	17.7403%

Equity Parameters

Before Tax Equity Dividend Rate	13.0%
Before Tax Equity Yield	18.0%
After-Tax Equity Yield	14.0%

Tax Considerations/or Investment Value Estimates Ordinary Income Tax Rate 35%

Capital Gains Income Tax Rate 17.5%

Depreciation Parameters (straight line assumed)

Building Tax Life	39 years
Building Basis	70% of value and 30% of CapEx reserve
FF&E Tax Life	7 years
FF&E Basis	10% of value and 70% of CapEx reserve
Land Basis	20% of value (land is not depreciated)

Public Company Information

Cost of Debt	8.0%
Debt to Total Value Ratio	60% (Giving a 40% Equity to Value Ratio)
Public Company Equity Parameters	

Risk Free Rate	5.0%
Equity Market Premium	8.0%
C-Corp. Beta	0.80
Public Company Tax Rate	35%

Other Valuation Parameters

Terminal Capitalization Rate	11.25%
Selling Expenses (Broker & Legal)	3.0% of selling price

Valuation Technique 1: Band of Investment Using One Stabilized Year

Instead of projecting net income over an extended period of time, a single, stabilized estimate of net income can be capitalized at an appropriate rate. The stabilized net income estimate is intended to reflect a representative year for the subject property in terms of occupancy, average rate, and net income. As just mentioned, the stabilized net income for the Edgemore Hotel is estimated to be \$4,107,000.

The next step in evaluating the Edgemore using the "band of investment using one stabilized year" technique is to develop a rate to capitalize the stabilized net income into an estimate of value. The band of investment, also known as the "weighted average cost of capital," or WACC, is based on the premise that most hotel investors purchase their properties using a combination of debt and equity capital. Both of these capital sources are seeking a specific rate of return on their invested capital as well as the return of their invested capital. The appropriate rate for the debt component is called the mortgage constant, which combines the return on capital (interest rate) with the return of capital (sinking fund factor) into a single rate. The proper rate of return for the equity component is the equity dividend rate. The appropriate overall capitalization rate is therefore the weighted average cost of capital from these two sources. The calculations that follow show how the band of investment using one stabilized year technique is used to estimate the value of the Edgemore Hotel:

Mortgage Finance Terms:

Mortgage Interest Rate:	8.75%
Mortgage Amortization:	25 years
Mortgage Constant: Loan-to-Value Ratio:	0.098657 60%

Equity Dividend Rate (Before Tax) 13%

Weighted Average Cost of Capital Calculation:

	Percent Of Value		Rate of Return	=	Weighted Average
Mortgage	60%	x	0.098657	=	0.059194
Equity	40%	x	0.130000	=	0.052000
Overall Capitalization Rate				=	0.111194

The stabilized net income is divided by the capitalization rate to calculate the capitalized value:

$\$4,107,000 \div 0.111194 = \$36,935,333$, say $\$36,935,000$ The value can be supported with the following calculations:

60% Mortgage	\$22,161,000	x	0.098657	=	\$2,186,000
40% Equity	<u>\$14,774,000</u>	x	0.130000	=	<u>\$1,921,000</u>
Total	\$36,935,000				\$4,107,000

These calculations show that the \$36,935,000 value can be divided into a mortgage portion of \$22,161,000 and an equity portion of \$14,774,000. The yearly mortgage payment, consisting of interest and amortization, is calculated by multiplying the original mortgage balance (\$22,161,000) by the mortgage constant (0.098657), which results in an annual debt service of \$2,186,000. The equity dividend is established by multiplying the equity investment (\$14,774,000) by the anticipated equity return (.130), which yields \$1,921,000. The annual debt service plus the equity dividend equals the stabilized net income of \$4,107,000.

Essentially, the band-of-investment technique works backward, using the projected stabilized net income to calculate the value that will meet the demands of both the debt and equity investors.

Valuation Technique 2: Room-Rate Multiplier

The lodging industry has a well-known rule of thumb known as the average daily rate (ADR) rule, which states that a property is worth 1,000 times its average daily rate on a per-room basis. The rule is essentially a RevPAR multiplier, setting value per room at 3.5 to 4.5 times annual room revenues, depending on occupancy.¹⁰ More formally:

$$\text{Value} = \text{Average Daily Rate} \times \text{Number of Rooms} \times 1,000$$

One of the questions that immediately arises when implementing the rule is which ADR to use: a "trailing" or historical ADR, ADR in the first projection year, or the stabilized year ADR. Since the rule's origins are clouded in lodging folklore, a generally accepted standard must be used when applying the rule. Extensive research by Corgel and deRoos revealed that practitioners generally use the current year's expected ADR when applying the rule to existing hotels, but apply a stabilized ADR when applying the rule to properties under development." This inconsistency is a source of confusion and inaccuracy. For our purposes, we take the position that the rule should be consistently applied to a stabilized ADR.

The stabilized ADR in 2006 (year 3) for the Edgemore Hotel is \$182.09, or \$171.64 expressed in 2004 dollars.¹² Applying the room-rate formula results in the following value:

$$\$171.64 \times 250 \times 1000 = \$42,910,000$$

For the Edgemore, the room-rate multiplier technique produces an estimate of value significantly in excess of all of the other techniques, indicating that this technique is subject to error.

Valuation Technique 3: The Coke™-Can Multiplier

Another valuation rule-of-thumb used in the lodging industry is that each room of a hotel is worth 100,000 times the price of a Coke™ in the on-floor vending machine or in-room mini-bar. More formally:

$$\text{Value} = \text{Coke}^{\text{TM}} \text{ price} \times \text{Number of Rooms} \times 100,000$$

The Edgemore Hotel sells cans of soda for \$1.50 in the room mini-bars. Thus, the value of the Edgemore by this "precise" valuation method is:

$$\$1.50 \times 300 \times 100,000 = \$37,500,000$$

We urge market participants to use this technique judiciously, as some properties seriously "misprice" soda in relation to property value.

Income Approaches to Value

Valuation Technique 4: 10-Year Discounted Cash Flow Using Mortgage and Equity Rates of Return

Valuation technique 4 is appropriate in dynamic hotel markets where supply and demand is constantly changing and the subject property's occupancy, rate, and net income has not stabilized. The projection of income and expenses reflect changing market conditions and extends over a five- to ten-year time frame. Traditionally, hotel investors use a ten-year projection period.

To convert the projected income stream into an estimate of value, the anticipated net income is allocated to the mortgage and equity components based on market rates of return and loan-to-value ratios (similar to the band-of-investment). The total of the mortgage component and the equity component equals the value of the property. The process is described as follows:

1. The terms of typical hotel financing are set forth, including interest rate, amortization term, and loan-to-value ratio.
2. An equity yield rate of return is established. Many hotel buyers base their equity investments on a desired equity yield rate or, equivalently, a desired internal rate of return on invested equity capital. This rate takes into account ownership benefits such as periodic cash-flow distributions, residual sale or refinancing distributions that return any property appreciation and mortgage amortization, income tax benefits, and various non-financial considerations such as status and prestige.
3. The value of the equity component is calculated by first deducting the annual debt service from the projected net income before debt service, leaving the net income to equity for each year. The net income as of the 11th year is capitalized into a reversionary value. After deducting the mortgage balance at the end of the tenth year and the typical brokerage and legal costs, the equity residual is discounted back to the date of value at the equity yield rate. The net income to equity for each of the ten projection years is also discounted to the present value. The sum of these discounted values equates to the value of the equity component. Adding the equity component to the initial mortgage balance yields the overall property value.

The mortgage and the debt service amounts are unknown because they depend on the value of the property, which in turn depends on the amounts of the mortgage and debt service. This is the classic simultaneous valuation conundrum. However, since

the loan-to-value ratio was determined in Step 1, the preceding calculation can be solved through an iterative process or by use of an algebraic equation that solves for the total property value using a ten-year mortgage and equity technique. This technique was developed by Suzanne R. Mellen, MAI.¹³

4. The value is proven by allocating the total property value between the mortgage and equity components and verifying that the rates of return set forth in Steps 1 and 2 can be met from the projected net income.

This process can be expressed in two algebraic equations that set forth the mathematical relationships between the known and unknown variables using the following symbols:

V	=	Value
NI	=	Net income available for debt service
M	=	Loan-to-value ratio
f	=	Annual debt service constant
n	=	Number of years in the projection period
d _e	=	Annual cash available to equity
d _r	=	Residual equity value
b	=	Brokerage and legal cost percentage
P	=	Fraction of the mortgage paid off during the projection period
f _p	=	Annual debt service constant required to amortize the entire loan during the projection period
R _r	=	Overall terminal capitalization rate that is applied to net income to calculate the total property reversion (sales price at the end of the projection period)
1/S ⁿ	=	Present worth of a \$1 factor (discount factor) at the equity yield rate (Ye)

Using these symbols, the following formulas can be used to express some of the components of this mortgage and equity valuation process.

Debt Service. A property's debt service is calculated by first determining the mortgage amount that equals the total value (V) multiplied by the loan-to-value ratio (M). Debt service is derived by multiplying the mortgage amount by the annual debt service constant (f). The following formula represents debt service:

$$f \times M \times V = \text{Debt Service}$$

Net Income to Equity (Equity Dividend). The net income to equity (d_e) is the property's net income before debt service (NI) less debt service. The following formula represents the net income to equity:

$$NI - (f \times M \times V) = d_e$$

Reversionary Value. The value of the hotel at the end of the tenth year is calculated by dividing the 11th-year net income before debt service (NI¹¹) by the terminal capitalization rate (R_r). The following formula represents the property's tenth-year reversionary value:

$$(NI^{11}/R_r) = \text{Reversionary Value}$$

Brokerage and Legal Costs. When a hotel is sold, certain costs are associated with the transaction. Normally, the broker is paid a commission and the attorney collects legal fees. In the case of hotel transactions, brokerage and legal costs typically range from 1 to 4 percent of the sale price. Because these expenses reduce the proceeds to the seller, they are usually deducted from the reversionary value in the mortgage and equity valuation process. Brokerage and legal costs (b), expressed as a percentage of reversionary value (NI¹¹/R_r), are calculated by application of the following formula:

$$b \times (NI^{11}/R_r) = \text{Brokerage and Legal Costs}$$

Ending Mortgage Balance. The mortgage balance at the end of the tenth year must be deducted from the total reversionary value (debt and equity) in order to estimate the equity residual. The formula used to determine the fraction of the loan remaining (expressed as a percentage of the original loan balance) at any point in time (P) takes the annual debt service constant of the loan over the entire amortization period (f) less the mortgage interest rate (i) and divides it by the annual debt service constant required to amortize the entire loan during the ten-year projection period (f_p) less the mortgage interest rate. The following formula represents the fraction of the loan paid off (P):

$$(f - i)/(f_p - i) = P$$

If the fraction of the loan paid off (expressed as a percentage of the initial loan balance) is P, then the remaining loan percentage is expressed as (1 - P). The ending mortgage balance is the fraction of the remaining loan (1 - P) multiplied by the initial loan amount (M x V). The following formula represents the ending mortgage balance:

$$(1 - P) \times M \times V = \text{Ending Mortgage Balance}$$

Residual Equity Value. The value of the equity upon the sale at the end of the projection period (d_r) is the reversionary value less the brokerage and legal costs and the ending mortgage balance. The following formula represents the residual equity value:

$$(NI^{11}/R_r) - (b \times (NI^{11}/R_r)) - ((1 - P) \times M \times V) = d_r$$

Annual Cash Flow to Equity. The annual cash flow to equity consists of the equity dividend for each projection year plus the equity residual at the end of the tenth year. The following formula represents the annual cash flow to equity:

$$NI^1 - (f \times M \times V) = d_e^1$$

$$NI^2 - (f \times M \times V) = d_e^2$$

$$NI^{10} - (f \times M \times V) = d_e^{10}$$

Value of the Equity. If the initial mortgage amount is calculated by multiplying the loan-to-value ratio (M) by the property value (V), then the equity value is one minus the loan-to-value ratio multiplied by the property value. The following formula represents the value of the equity:

$$(1 - M) \times V$$

Discounting the Cash Flow to Equity to the Present Value. The cash flow to equity in each projection year is discounted to the present value at the equity yield rate ($1 / S^n$). The sum of these cash flows is the value of the equity: $(1 - M) \times V$. The following formula represents the calculation of equity as the sum of the discounted cash flows:

$$(d_e^1 \times 1/S^1) + (d_e^2 \times 1/S^2) + \dots + (d_e^{10} \times 1/S^{10}) + (d_r \times 1/S^{10}) = (1 - M) \times V$$

Combining the Equations: Annual Cash Flow to Equity and Discounting the Cash Flow to Equity to the Present Value. The last step is to arrive at one overall equation that shows that the annual cash flow to equity plus the yearly discounting to the present value equals the value of the equity:

$$((NI^1 - (f \times M \times V)) \times 1/S^1) + ((NI^2 - (f \times M \times V)) \times 1/S^2) + \dots$$

$$((NI^{10} - (f \times M \times V)) \times 1/S^{10}) +$$

$$[(NI^1/R_e) - (b \times (NI^1/R_e)) - ((1 - P) \times M \times V)] \times 1/S^{10} = (1 - M) \times V$$

Because the only unknown in this equation is the property's value (V), it can be solved readily.

Solving for Value Using the Simultaneous Valuation Formula. In the case of the subject property (the fictional Edgemore Hotel), the following known variables have been determined:

Annual Net Income	NI	For our purposes here, the 2006 NI is considered the stabilized net income. The net incomes for 2007-2013 are assumed to increase at 3.0 percent per year
Loan-to-Value Ratio	M	60.0%
Mortgage Interest Rate	i	8.75%

Exhibit 2 Present Worth of \$1 Factor at the Equity Yield Rate

Year	Present Worth of \$1 Factor at 18.0%
1	0.847458
2	0.718184
3	0.608631
4	0.515789
5	0.437109
6	0.370432
7	0.313925
8	0.266038
9	0.225456
10	0.191064

Debt Service Constant f 0.098657

Equity Yield Y_e 18.0%

Brokerage and Legal Fees b 3.0%

Terminal Capitalization Rate R_t 11.25%

Exhibit 2 illustrates the present worth of \$1 factor at the 18-percent equity yield rate.

Using these known variables, the following intermediary calculations must be made before applying the simultaneous valuation formula. The fraction of the loan paid off during the projection period is:¹⁴

$$P = 0.177403$$

The annual debt service is calculated as $(f \times M \times V)$:

$$(f \times M \times V) = 0.098657 \times 0.60 \times V = 0.059194V$$

Inserting the known variables into the hotel valuation formula produces the following:

$$(3,007,000 - 0.059194 \times V) \times 0.847458 +$$

$$(3,664,000 - 0.059194 \times V) \times 0.718184 +$$

$$(4,357,000 - 0.059194 \times V) \times 0.608631 +$$

$$(4,488,000 - 0.059194 \times V) \times 0.515789 +$$

$$(4,622,000 - 0.059194 \times V) \times 0.437109 +$$

$$(4,761,000 - 0.059194 \times V) \times 0.370432 +$$

$$(4,904,000 - 0.059194 \times V) \times 0.313925 +$$

$$(5,051,000 - 0.059194 \times V) \times 0.266038 +$$

$$(5,202,000 - 0.059194 \times V) \times 0.225456 +$$

$$(5,359,000 - 0.059194 \times V) \times 0.191064 +$$

$$\{[(5,519,000/0.1125) - (0.03 \times (5,519,000/0.1125)) - ((1 - 0.17740) \times 0.60 \times V)] \times 0.191064\} = (1 - 0.60) V$$

Like terms are combined as follows:

$$\begin{aligned} \$28,102,819 - 0.360326V &= (1 - 0.60) V \\ \$28,102,819 &= 0.639674 V \\ V &= \$28,102,819/0.639674 \\ V &= \$36,961,542 \\ &= \text{say } \$36,962,000 \end{aligned}$$

The value is proven by calculating the yields to the mortgage and equity components during the projection period. If the mortgagee achieves a yield of 8.75 percent and the equity yield is 18 percent, then \$36,962,000 is the correct value by the income capitalization approach. Using the assumed financial structure set forth in the previous calculations, the market value can be allocated between the debt and equity as follows:

Proof of Value	Mortgage Component (60%)	\$22,177,000
	Equity Component (40%)	<u>14,785,000</u>
	Total	\$36,962,000

The annual debt service is calculated by multiplying the mortgage component by the mortgage constant:

Mortgage Component	\$22,177,000
Mortgage Constant	<u>0.098657</u>
Annual Debt Service	\$2,187,914

The net income (or cash flow) to equity is calculated by deducting the debt service from the projected income before debt service (see Exhibit 3).

The equity residual at the end of the tenth year is calculated as follows:

Reversionary Value (\$5,555,000/0.1125)	\$49,061,000
Less: Brokerage and Legal Fees (3.0%)	1,472,000
Less: Mortgage Balance	<u>18,243,000</u>
Net Sale Proceeds to Equity	\$29,346,000

The overall property yield (before debt service), the yield to the lender, and the yield to the equity position have been calculated by computer, with the results shown in Exhibit 4.

Exhibit 3 Forecast of Net Income to Equity

Year	Net Income Available for		Debt Service	Net Income to Equity
	Debt Service			
2004	\$3,007,000	-	\$2,188,000	= \$ 819,000
2005	3,664,000	-	2,188,000	= 1,476,000
2006	4,357,000	-	2,188,000	= 2,169,000
2007	4,488,000	-	2,188,000	= 2,300,000
2008	4,622,000	-	2,188,000	= 2,434,000
2009	4,761,000	-	2,188,000	= 2,573,000
2010	4,904,000	-	2,188,000	= 2,716,000
2011	5,051,000	-	2,188,000	= 2,863,000
2012	5,202,000	-	2,188,000	= 3,015,000
2013	5,359,000	-	2,188,000	= 3,171,000

Exhibit 4 Overall Property Yields

Position	Value	Projected Yield (Internal Rate of Return Over 10-Year Holding Period)
Total Property	\$36,962,000	13.20%
Mortgage	22,177,000	8.75%
Equity	14,785,000	18.00%

Note: Whereas the mortgage constant and value are calculated on the basis of monthly mortgage payments, the mortgage yield in this proof assumes single annual payments. As a result, the proof's derived yield may be slightly less than that actually input.

Exhibits 5 through 7 demonstrate that the property receives its anticipated yields, proving that the \$36,962,000 value is correct based on the assumptions used in this approach.

Valuation Technique 4a: 10-Year Discounted Cash Flow Using Mortgage-Equity Model and Debt Coverage Ratio

Valuation technique 4a uses a loan-to-value ratio to link the amount of the initial mortgage balance with the property's value. In many instances, the mortgage lender is also interested in the relationship between the hotel's net income and annual debt service (interest plus amortization). The debt coverage ratio (Net income - Annual Debt Service) is used in these cases instead of the loan-to-value ratio. Instead of establishing a maximum loan amount to constrain value, the debt coverage ratio requires that the annual net income "cover" the debt service by a specific amount. For example, a debt coverage ratio of 2.0 means the lender requires \$2.00 in net income for each \$1 in annual debt service. This establishes a maximum annual debt service, and hence a maximum loan amount, given market interest rates and the amortization period. Many lenders employ both the loan-to-value ratio and debt coverage ratio and will lend funds based on the constraint that results in the smallest loan.

In determining the debt coverage ratio, one must decide which net income to use. Since net income typically increases over time, the most conservative lenders base the loan on historical or the smallest of the projected net incomes. Other lenders use a "stabilized" net income, especially when lending to recovering properties or to new properties that take time to reach a stable occupancy rate (typically a stable occupancy rate is reached in the second, third, or fourth year of operation).

Using the notation from technique 4, the following formulas express the components of this mortgage and equity valuation process. The only new symbols are "DCR," which stands for "debt coverage ratio," and "NP," which represents the "stabilized" net income used by lenders to size the loan.

Exhibit 5 Total Property Yield

Year	Net Income Before Debt Service		Present Worth of \$1 Factor at 13.20%	=	Discounted Cash Flow
2004	\$ 3,007,000	x	0.883389	=	\$ 2,656,000
2005	3,664,000	x	0.780376	=	2,859,000
2006	4,357,000	x	0.689375	=	3,004,000
2007	4,488,000	x	0.608986	=	2,733,000
2008	4,622,000	x	0.537971	=	2,487,000
2009	4,761,000	x	0.475238	=	2,263,000
2010	4,904,000	x	0.419820	=	2,059,000
2011	5,051,000	x	0.370864	=	1,873,000
2012	5,202,000	x	0.327617	=	1,704,000
2013	52,947,000 *	x	0.289413	=	15,324,000
	Total Property Value				\$36,962,000

*10th year net income of \$5,359,000, plus sales proceeds of \$47,589,000

Exhibit 6 Mortgage Component Yield

Year	Debt Service		Present Worth of \$1 Factor at 7.75%	=	Discounted Cash Flow
2004	\$ 2,188,000	x	0.920132	=	\$ 2,013,000
2005	2,188,000	x	0.846642	=	1,852,000
2006	2,188,000	x	0.779022	=	1,704,000
2007	2,188,000	x	0.716803	=	1,568,000
2008	2,188,000	x	0.659553	=	1,443,000
2009	2,188,000	x	0.606876	=	1,328,000
2010	2,188,000	x	0.558405	=	1,222,000
2011	2,188,000	x	0.513806	=	1,124,000
2012	2,188,000	x	0.472770	=	1,034,000
2013	20,341,000 *	x	0.435010	=	8,888,000
	Value of the Mortgage Component				\$22,177,000

*10th year debt service of \$2,188,000 plus ending mortgage balance of \$18,243,000

Exhibit 7 Equity Component Yield

Year	Net Income To Equity		Present Worth of \$1 Factor at 18.0%	=	Discounted Cash Flow
2004	\$ 819,000	x	0.847458	=	\$ 694,000
2005	1,476,000	x	0.718184	=	1,060,000
2006	2,169,000	x	0.608631	=	1,320,000
2007	2,300,000	x	0.515789	=	1,186,000
2008	2,434,000	x	0.437109	=	1,064,000
2009	2,573,000	x	0.370432	=	953,000
2010	2,716,000	x	0.313925	=	853,000
2011	2,863,000	x	0.266038	=	762,000
2012	3,015,000	x	0.225456	=	680,000
2013	32,517,000 *	x	0.191064	=	6,213,000
	Value of the Mortgage Component				\$14,785,000

*10th year net income to equity of \$3,171,000 plus net sale proceeds of \$29,346,000

Debt Service. A property's debt service is calculated by dividing the stabilized net income by the debt coverage ratio:

$$NI^5/DCR = \text{Debt Service}$$

Mortgage Amount. Without the loan-to-value ratio to size the mortgage, the size of the mortgage is calculated by applying the mortgage constant to the annual debt service. Since the mortgage constant is the annual debt service for each \$1 of mortgage, the mortgage can be estimated by dividing the debt service by the mortgage constant:

$$NI^5/(DCR \times f) = \text{Mortgage Amount}$$

Net Income to Equity (Equity Dividend). The net income to equity (d_e) is the property's net income before debt service (NI) less debt service. The following formula represents the net income to equity:

$$NI - (NI^5/DCR) = d_e$$

Reversionary Value. The value of the hotel at the end of the tenth year is calculated by dividing the 11th-year net income before debt service (NI^{11}) by the terminal capitalization rate (R_t). The following formula represents the property's tenth-year reversionary value:

$$(NI^{11}/R_t) = \text{Reversionary Value}$$

Brokerage and Legal Costs. When a hotel is sold, certain costs are associated with the transaction. Normally, the broker is paid a commission and the attorney collects legal fees. In the case of hotel transactions, brokerage and legal costs typically range from 1 to 4 percent of the sale price. Because these expenses reduce the proceeds to the seller, they are usually deducted from the reversionary value in the mortgage and equity valuation process. Brokerage and legal costs (b), expressed as a percentage of reversionary value (NI^{11}/R_t), are calculated using the following formula:

$$b \times (NI^{11}/R_t) = \text{Brokerage and Legal Costs}$$

Ending Mortgage Balance. The mortgage balance at the end of the tenth year must be deducted from the total reversionary value (debt and equity) in order to estimate the equity residual. The formula used to determine the fraction of the loan remaining (expressed as a percentage of the original loan balance) at any point in time (P) takes the annual debt service constant of the loan over the entire amortization period (f) less the mortgage interest rate (i), and divides it by the annual constant required to amortize the entire loan during the ten-year projection period (f_p) less the mortgage interest rate. The following formula represents the fraction of the loan paid off (P):

$$(f - i)/(f_p - i) = P$$

If the fraction of the loan paid off (expressed as a percentage of the initial loan balance) is P , then the remaining loan percentage is expressed as $1 - P$. The ending mortgage balance is the fraction of the remaining loan ($1 - P$) multiplied by the initial loan amount: $NI^5/(DCR \times f)$. The following formula represents the ending mortgage balance:

$$(1 - P) \times (NI^5/DCR \times f) = \text{Ending Mortgage Balance}$$

Equity Residual Value. The value of the equity upon the sale at the end of the projection period (dp) is the reversionary value less the brokerage and legal costs and

the ending mortgage balance. The following formula represents the equity residual value:

$$(NI^{11}/R_t) - (b \times (NI^{11}/R_t)) - ((1 - P) \times NI^5/(DCR \times f)) = d_e$$

Annual Cash Flow to Equity. The annual cash flow to equity consists of the equity dividend for each projection year plus the equity residual at the end of the tenth year. The following formula represents the annual cash flow to equity:

$$NI^1 - (NI^5/DCR) = d_e^1$$

$$NI^2 - (NI^5/DCR) = d_e^2$$

:

:

$$NI^{10} - (NI^5/DCR) = d_e^{10}$$

Value of the Equity. The cash flow to equity in each projection year is discounted to the present value at the equity yield rate ($1/S^y$). The sum of these cash flows is the value of the equity. The following formula represents the calculation of equity as the sum of the discounted cash flows:

$$(d_e^1 \times 1/S^1) + (d_e^2 \times 1/S^2) + \dots + (d_e^{10} \times 1/S^{10}) + (d_e \times 1/S^{10}) = \text{Value of Equity}$$

Combining the Equations: Annual Cash Flow to Equity and Discounting the Cash Flow to Equity to the Present Value. The last step is to arrive at one overall equation that shows that the annual cash flow to equity plus the yearly discounting to the present value equals the value of the equity:

$$((NI^1 - NI^5/DCR) \times 1/S^1) + ((NI^2 - NI^5/DCR) \times 1/S^2) + \dots$$

$$((NI^{10} - NI^5/DCR) \times 1/S^{10}) +$$

$$\{[(NI^{11}/R_t) - (b \times (NI^{11}/R_t)) - ((1 - P) \times (NI^5/DCR \times f))]\} \times 1/S^{10} +$$

$$NI^5/(DCR \times f) = V$$

Because the only unknown in this equation is the property's value (V), it can be solved readily. Note that this technique does not have the "simultaneous" problem of valuation technique 4.

For the Edgemore Hotel, we estimate market value using a debt coverage ratio of 1.90 on the year 3 stabilized income of

\$4,357,000 to estimate annual debt service and hence the mortgage amount. The value can be estimated by:

$$\begin{aligned}
 & (3,007,000 - (4,357,000/1.90) \times 0.847458 + \\
 & (3,664,000 - (4,357,000/1.90) \times 0.718184 + \\
 & (4,357,000 - (4,357,000/1.90) \times 0.608631 + \\
 & (4,488,000 - (4,357,000/1.90) \times 0.515789 + \\
 & (4,622,000 - (4,357,000/1.90) \times 0.437109 + \\
 & (4,761,000 - (4,357,000/1.90) \times 0.370432 + \\
 & (4,904,000 - (4,357,000/1.90) \times 0.313925 + \\
 & (5,051,000 - (4,357,000/1.90) \times 0.266038 + \\
 & (5,051,000 - (4,357,000/1.90) \times 0.225456 + \\
 & (5,359,000 - (4,357,000/1.90) \times 0.191064 + \\
 & \{[(5,519,000/0.1125) - (0.03 \times (5,519,000/0.1125)) - \\
 & ((1-0.177403) \times (4,357,000/(1.90 \times 0.098657)))] \times 0.191064\} + (4,357,000/(1.90 \times 0.098657)) = V
 \end{aligned}$$

For the sake of brevity, the intermediate calculations are omitted. The value of the property is calculated to be \$37,387,667, say \$37,388,000.

Valuation Technique 5: After-Tax Investment Model

As demonstrated by deRoos and Rushmore,¹⁵ the hotel valuation formula can be extended to incorporate the effects of income taxes on value. Used in this fashion, the model is formally known as an "investment value model" because it reflects the unique characteristics of a particular investor, and it ceases to serve as a market value model because the valuation parameters are no longer derived totally from market information.

In addition to the lender criteria, investor criteria, and property information used in technique 4, the after-tax investment technique needs information on depreciation rates, tax rates, and the projected amounts of the annual reserve for replacement.

The parameters in the after-tax investment model are:

- V = Value of the property
- NI_j = Net income available for debt service, indexed by year (i.e., NI₁ for year one net income)
- NI_n = Net income used for the reversion calculation, usually specified as the NI in year n+1
- n = Number of years in the projection period
- Y_e = The equity yield, on an after-tax basis
- M = Loan-to-value ratio
- R_t = Overall terminal capitalization rate applied to NI¹¹ to calculate the property reversion, on an after-tax basis
- b = Selling expenses
- i = Mortgage interest rate m = Mortgage amortization term
- f = Annual debt service constant
- t₁ = Ordinary income- tax rate
- t₂ = Capital gains tax rate
- P = Fraction of the mortgage paid off during the projection period
- RFR_j = A set of cash flows that will be spent on improving the property over time (i.e., the reserve for replacement, indexed by year)
- LI = Depreciable life of the building (years)
- L2 = Depreciable life of the furniture, fixtures, and equipment (FF&E) (years)
- IB = Proportion of total value attributable to the building for depreciation purposes
- IBr = Proportion of RFR spent on improvements to the building for depreciation purposes
- IF = Proportion of total value attributable to FF&E for depreciation purposes
- IFr = Proportion of RFR spent on replacement of FF&E for depreciation purposes

Exhibit 8 After-Tax Investments Model Based on the Hotel Valuation Formula

$$\begin{aligned}
 \text{Value} = & VM \left(\sum_{j=1}^n \frac{NI_j (1-t_1)}{(1+Y_e)^j} \right) \frac{\left(1 - \frac{1}{(1+Y_e)^n}\right) fMV}{Y_e} + \left(\sum_{j=1}^n \frac{NI_j (1-P)MV}{(1+r)^j} \right) \frac{\left(1 - \frac{1}{(1+Y_e)^n}\right) fVIB}{Y_e L1} + \left(\sum_{j=1}^n \frac{IBr RFR_j \left(1 - \frac{1}{(1+Y_e)^{n-j}}\right)}{L1 Y_e (1+Y_e)^j} \right) \\
 & \frac{\left(1 - \frac{1}{(1+Y_e)^{L2}}\right) fVIF}{Y_e L2} + \left(\sum_{j=1}^n \frac{IFr RFR_j \left(1 - \frac{1}{(1+Y_e)^{n-j}}\right)}{L2 Y_e (1+Y_e)^j} \right) \left(\sum_{j=1}^n \frac{RFR_j}{(1+Y_e)^j} \right) \\
 & \frac{NI_{11} (1-b)}{R - (1-P)MV} \left(\frac{NI_{11} (1-b)}{R} \frac{nYIB}{L1} + \frac{nVIF}{L2} \left(\sum_{j=1}^n \frac{RFR_j}{L1} \right) + \left(\sum_{j=1}^n \frac{IFr RFR_j (n-j)}{L2} \right) \right) \frac{1}{(1+Y_e)^n}
 \end{aligned}$$

Valuation of Hotel Properties Owned by a Publicly Listed Company

Public company techniques focus on whether an acquisition adds value to a publicly traded firm. Recognizing the firm's unique cost of capital, the technique we present is a relatively simple but powerful measure of the impact of a purchase on share value. The model is based on a popular tool from managerial accounting known as "economic value added," or EVA. We apply the EVA methodology to the valuation question faced by a c-corporation. The EVA technique is classified an investment value model because it relies on the unique investment parameters of a given firm, not market derived data for the valuations.

Valuation Technique 6: Economic Value Added

While EVA is traditionally used to value entire firms, we believe the methodology can be extended to single asset valuation as well. EVA is defined as the excess return on investment available to shareholders after deducting the risk-adjusted cost of capital. More formally:

$$\text{EVA} = \text{A-T Earnings} - (\text{WACC} \times \text{Property Investment})$$

"A-T Earnings" are the after-tax accounting definition of earnings generated by the investment. "WACC" is the weighted-average cost of capital, on an after-tax basis. The valuation is performed by realizing that the most the firm would pay for a property is that amount which makes EVA equal to zero. Given this relationship, one can rearrange the terms to arrive at the following equality:

$$\text{Property Investment} = \frac{\text{A-T Earnings}}{\text{WACC}}$$

Thus, in the end, this technique becomes a specialized form of a capitalized-in-come technique. The numerator (A-T Earnings) is the accounting measure of long-run income, and the denominator (WACC) recognizes the unique capital structure of a given firm, including its cost of debt and beta. If the property can be acquired for less than the value indicated by the EVA technique, it is accretive and adds value to the firm.

To implement the model, one must transform the traditional real estate definition of net income into A-T Earnings and determine the weighted-average cost of capital. A-T Earnings are defined as follows, starting from the traditional definition of net income used in a typical lodging pro-forma like Exhibit I:¹⁷

	Net income
Less:	Building depreciation
Less:	<u>Income Taxes</u>
	A-T Earnings

--Income taxes are calculated by deducting depreciation and interest expense from net income to determine taxable income. Taxable income is then multiplied by a tax rate to arrive at the income tax. Since both the interest expense and depreciation charges are a function of property value, this problem is simultaneous and must be solved iteratively to estimate the proper value.

The weighted-average cost of capital is derived as follows:¹⁸

Debt Component:

$$\text{Debt Rate (\%)} \times (1 - \text{Tax Rate (\%)}) \times \text{Debt to Value Ratio (\%)} = \text{Debt Component}$$

Equity Component:

$$\{\text{Risk Free Rate (\%)} + (\text{Equity Market Premium (\%)} \times \text{Firm Beta})\} \times \text{Equity to Value Ratio (\%)} = \text{Equity Component}$$

$$\text{WACC} = \text{Debt Component} + \text{Equity Component}$$

The equity component is a direct application of modern portfolio theory. A firm's equity cost of capital is derived as a premium over the risk-free rate. The premium is a function of the overall market premium for equity investments, times the unique beta of the subject firm. The debt to value and equity to value ratios are determined from the firm's capital structure, as the percentage of total firm value attributable to debt and equity, respectively.

To perform the EVA valuation on the Edgemore Hotel, we start with the calculation of A-T earnings, using the assumptions listed previously:

	Stabilized Net Income	4,107,000
Less:	Building Depreciation	662,500
Less:	<u>Income Tax (see calc. below)</u>	<u>609,800</u>
	A-T Earnings	<u>2,834,700</u>

Income Tax Calculation:

	Stabilized Net Income	4,107,000
Add:	Stabilized CapEx reserve	<u>597,000</u>
	Equals: EBITDA	4,614,000
Less:	Depreciation	1,189,800
Less:	<u>Interest Expense</u>	<u>1,771,700</u>
	Equals: Taxable Income	1,742,200
Times:	Tax Rate	<u>35%</u>
	Income Tax	<u>609,800</u>

Depreciation consists of two pieces, building and FF&E. Building depreciation is based on a 39-year life, with 70 percent of total value as the building basis; FF&E depreciation is based on a 7-year life, with 10 percent of total value as the FF&E basis. With value established at \$36,911,000, the depreciation calculation is:

$$\begin{aligned} \text{Building Portion} & \$36,911,000 \times 70\% \div 39 \text{ years} = 662,500/\text{year} \\ \text{FF\&E Portion} & \$36,911,000 \times 10\% \div 7 \text{ years} = \underline{527,300/\text{year}} \\ \text{Total Depreciation} & \qquad \qquad \qquad \$1,189,800/\text{year} \end{aligned}$$

Interest expense is calculated as:

$$\begin{aligned} \text{Interest Expense} &= \text{Value} \times \text{Debt Cost (\%)} \times \text{Debt to Value Ratio} \\ &= \$36,911,000 \times 8.0\% \times 60\% = \$1,771,700 \end{aligned}$$

Next, the WACC is calculated:

$$\begin{aligned} \text{Debt Component} &= 8.0\% \times (1 - 35\%) \times 60\% &= 3.120\% \\ \text{Equity Component} &= \{5.0\% + (8.0\% \times 0.80)\} \times 40\% &= 4.560\% \\ \text{WACC} & &= 7.680\% \end{aligned}$$

$$\begin{aligned} \text{Value} &= \text{A-T Earnings} \div \text{WACC} \\ &= \$2,834,700 \div 0.07680 = \$36,910,720, \text{ say } \$36,911,000 \end{aligned}$$

Valuation Technique 7: Sales Comparison Approach

Three property transactions in 2002 and 2003 were found in the HVS International Major Sales Transactions database of hotels that were considered comparable to the Edgemore Hotel. Exhibit 9 summarizes these transactions.

The sales comparison approach takes information from these sales and adjusts the data to arrive at an estimate of value for the Edgemore. The most fundamental adjustment is to derive a sale price per room, as shown in Exhibit 9. Other adjustments are made for the condition of the physical plant, relative market strength, brand affiliation, age, below-market financing, and the mix of facilities offered.

In the case of the Edgemore Hotel, Sale No. 1 needs to be adjusted upward 3 percent, due to the timing of the sale. Sale No. 2 needs to be adjusted upward 5 percent, due to the superior physical condition of the Edgemore. Sale No. 3 needs to be adjusted downward 5 percent, due to the Edgemore's inferior location. This gives final adjusted sale prices per room, and indicated property values for the Edgemore, as follows:

Sale No.	Adjusted Sale Price Per Room	Indicated Value of The Edgemore
1	\$154,500	\$38,625,000
2	\$146,580	\$36,645,000
3	\$146,775	\$36,693,750

The indicated values provide a range of values that would be expected in a competitive selling environment. In most cases, the adjustments are part of the appraiser's art, because the appraiser must use his or her judgment in their

Exhibit 9 Comparable Sales Transactions

	Sale No. 1	Sale No. 2	Sale No. 3
Sale Price (in 2003 dollars*)	\$48,000,000	\$32,806,000	\$44,805,000
Property Size	320 rooms	235 rooms	290 rooms
Sale Price per Room	\$150,000	\$139,600	\$154,500
Date of Sale	March 2002	December 2002	July 2003
TTM** Occupancy	55%	58%	61%
TTM** Average Rate	\$159.75	\$162.50	\$166.00
Rate			
TTM** net income, expressed in 2003 dollars	\$3,040,000	\$2,105,000	\$2,297,000
Comments:	Sale within 6 months of 9/11; TTM NI well below long term potential.	Some deferred maintenance, but a well run property.	Market leader, superior location and physical condition potential.

* Prices and income have been adjusted for inflation to reflect price levels at the end of 2003
 ** Trailing 12 months

application.¹⁹ In the case of the Edgemore Hotel, sale 3 is more representative of market transactions than are sales 1 and 2, which are generally understood to have been "tainted" by the events of September 11, 2001. We will use the range of \$36,345,000 to \$38,625,000 as a reasonable estimate of the property value via the sales comparison approach.

Valuation Technique 8: Market-Derived Capitalization Rate

The information in Exhibit 10 can be used to derive market-based capitalization rates. It is important to develop these rates consistently; we recommend using the net income in the 12 months prior to sale as the basis for the calculations. The capitalization rate is simply the trailing 12-month net income divided by the sale price. The table below details the rates for the three comparable sales shown in Exhibit 9:

Sale No.	1998 Net Income	Sale Price	Market Derived Capitalization Rate
1	\$3,040,000	\$48,000,000	6.33%
2	\$2,105,000	\$32,806,000	6.42%
3	\$2,927,000	\$44,805,000	6.53%

The market-derived capitalization rates range from a low of 6.33 percent to a high of 6.53 percent, with an average of 6.43 percent. These rates are based on historic net income, which does not mirror the future path of expected earnings, which is expected to rise rapidly. It is therefore important to adjust these rates if it

Exhibit 10 Classification and Comments on Income Approaches to Value

Model	Classification		Basis of Return Assumptions	Comments
	Before or After Tax	Cap or Yield		
Band of Investment	B	C	WACC, EDR	Simple, easy to understand, hard to support EDR.
Hotel Valuation Formula Before-Tax	B	Y	LTV or DCR, debt terms, equity yield	Complicated, "accurate," tough to support equity yield, hard to explain. Explicit handling of reversion.
Economic Value Added	A	C	After tax cost of debt & equity, market returns & firm beta	Limited to C-corp environment. Accounting-based measure of net income (A-T earnings) not appealing to real estate traditionalists.
Hotel Valuation Formula After-Tax	A	Y	LTV or DCR debt terms, equity yield	See Before-Tax comments. Very hard to implement. Can look at relative size of tax effects.
Market Derived Capitalization Rate	B	C	Overall cap rate, no debt	Single, easy to understand, well supported, comparable adjustments difficult.
Terms:	DCR—Debt Coverage Ratio EDR—Equity Dividend Rate LTV—Loan to Value Ratio			

is expected that future conditions will make these rates higher or lower. We therefore will adjust the average market-derived capitalization rate down to 6.4 percent to reflect this future increase in earnings. Dividing the Edgemore's 2003 net income by the 6.4 percent capitalization rate obtains the following estimate of value:

$$\$2,383,000 \div 0.064 = \$37,234,375, \text{ say } \$37,234,000$$

Note that the market-derived capitalization rates are low by historical standards. The reason is that the income in the 12 months preceding was exceptionally low, significantly impacted by the combined impact of dilution due to new supply and a drop in travel to Major City for a period following September 11, 2001. As the market moves to equilibrium, capitalization rates will revert to the

historical equilibrium range of 10.0 to 12.0 percent.

Valuation Technique 9: Cost Approach—Age-Life Method

The cost approach typically involves the use of a cost estimating guide or guides to arrive at a cost to determine the replacement cost of the property. Appraisers often use a unit-in-place method to estimate value of the building and FF&E. Data for many prototype chain properties is generally available; the more unique the property, the more difficult it is to establish the replacement cost. Use of the Marshal and Swift™ estimating guide and consultation with local architects produce data for the Edgemore as follows:

Land	\$7,500,000 (5 acres@ 1,500,000/acre)
Building & improvements, including soft costs	\$30,500,000 (\$122,000/room)
FF&E	\$ 3,500,000 (\$14,000/room)
Preopening & working capital	<u>\$ 1,350,000</u> (\$5,400/room)
Total replacement cost	\$42,850,000 (\$176,400/room)

The total represents the replacement cost, without deductions for depreciation, the physical deterioration, functional obsolescence, and external obsolescence of the property. As shown below we use the age-life method to make an overall depreciation adjustment, reasonable for an eight-year-old property with little external obsolescence. We assume a physical life for the building of 50 years and an average physical life for the FF&E of ten years. We then add back the reserve for replacement invested in the property over the eight-year life of the property.

Total replacement cost:	\$42,850,000
Less: Building depreciation	\$4,880,000 (8/50 of the replacement cost)
FF&E depreciation	\$ 2,800,000 (8 /10 of the replacement cost)
Add: CapEx reserve	\$ 3,000,000 (8 years of net new investment)
Adjusted total	\$38,170,000

The use of age-life method is a reasonable approach with a relatively young building and one that is built with conventional means and methods. The principal criticism is that it relies heavily on accurate replacement cost data; there is also the problem of ad hoc adjustments for depreciation.

Valuation for Assessment Purposes

We submit that the income approach is appropriate for the question of valuation for assessment purposes. Further, adjustments to the net income can isolate the cash flow to the real property component, which can then be capitalized to produce an estimate of the real property distinct from the personal property.

In general, the net income of a property must be adjusted for three factors to isolate the cash flow to the real property:

1. The return *on* and return *of* funds invested in FF&E
2. Any fees paid to the manager and fees paid for brand affiliation
3. Any net income that might accrue as a result of superior management²⁰

In the case of the Edgemore, there is the question of whether the 105-percent RevPAR penetration of the property is attributable to the real property or to the personal property component. For purposes of clarity, assume that all of the superior performance is due to superior management. To make the adjustment, we take the following steps:

- Establish 2006 as the benchmark, stabilized year. The stabilized net income at a 105-percent RevPAR penetration is \$4,107,000.
- Establish the financial performance of the property with a 100-percent RevPAR penetration, by reducing occupancy.
- Make any reductions for the costs of management and brand that could be achieved with the change in RevPAR penetration.

The result of these steps produces an adjusted stabilized net income of \$3.743 million as opposed to the \$4.107 million figure noted. From this figure, we must deduct the annual flows appropriate for items 1 and 2 in the foregoing list.

To properly handle the return *on* and return *of* investment for the FF&E, we proceed as follows:

- Add the CapEx reserve to net income. This is done to avoid a duplicate deduction via the return calculations performed in the second step.
- Deduct the appropriate amounts for the returns *on* and the return *of* the FF&E, using the capitalization rate for the property.

The appropriate return on the FF&E is simply the capitalization rate times the original investment of \$3,500,000 used in the cost approach technique. The appropriate return of the FF&E is a sinking fund factor (SFF) using the capitalization rate and the average physical life of the FF&E. We use the capitalization rate derived in valuation technique 1, or 11.119 percent.

Return on FF&E	11.119%
Return of FF&E	<u>5.946%</u> (SFF for 11.194%, 10-year average physical life)
Total	17.065%

Annual return *on* and return *of* FF&E = \$3,500,000 x 0.17698 = \$597,000/year

No adjustment is necessary for management and brand fees, as they are deducted from the definition of net income used in Exhibit 1 and from the stabilized income. The summary of adjustments follows:

Unadjusted 2004 stabilized net income	\$ 4,107,000
Add: CapEx reserve (stabilized) ²¹	<u>615,000</u>
Equals: Unadjusted 2004 stabilized net income before CapEx reserve	4,722,000
Less: Adjustment for superior management	<u>364,000</u>
Adjusted stabilized net income	4,358,000
Less: Return on and return of FF&E	\$ 597,000
Less: Management and brand fees	<u>-0-</u>
Adjusted net income	
Add: attributable to the	<u> </u>
Equals: real property	\$ 3,761,000

The adjusted net income attributable to the real property is divided by the capitalization rate to calculate the capitalized value of the real property component.

$$\$3,761,000 - 0.111943 = \$33,823,663, \text{ say } \$33,824,000$$

Summary

The results of the nine approaches to valuing the Edgemore Hotel are summarized below:

Rules of Thumb

Band of Investment (technique 1)	\$36,395,000
Room-Rate Multiplier (technique 2)	\$42,910,000
Coke™-Can Multiplier (technique 3)	\$37,500,000

Income Approaches to Value

Hotel Valuation Formula—LTV version (technique 4)	\$36,962,000
Hotel Investment Formula—DCR version (technique 4a)	\$37,388,000
Hotel Valuation Formula—After-Tax (technique 5)	\$37,017,000

Valuation by a Publicly Listed Company

Economic Value-added (technique 6)	\$36,911,000
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Sales Comparison Approaches

Sales Comparison Approach (technique 7)	\$36.345-38.625 million
Market-Derived Capitalization Rate (technique 8)	\$37,234,000

Cost-Approach (technique 9)	\$38,170,000
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With the exception of room-rate multiplier (technique 2), the techniques produce values that are in a very narrow range, from \$36,395,000 to \$38,625,000. The room-rate multiplier produces a value that is high, because it is based on a single revenue metric and does not account for the operating characteristics of the property.

The question, "What is a property worth?" has given rise to an increasingly broad set of methods to estimate value. The rules of thumb give a rough indication of value, but should not be relied on as definitive. They are simple, single-dimension models that do not incorporate the collective actions of market participants. They do, however, give a quick "ballpark" estimate.

Appraisers are charged with estimating *market value*, using the classic trioka of the cost approach, the sales comparison approach, and the income approach. The market-derived capitalization rate is a hybrid approach; it uses an income approach to value the property, with the capitalization rate derived from comparable sales.

Investors, on the other hand, wish to estimate *investment value*, which includes the effects of income taxes, the investor's unique cost of capital, and other investor-specific conditions. To estimate value, investors typically rely on a modified income approach tailored to their circumstances.

Publicly traded real estate firms have a unique form of investment-value question. Managers in this environment seek to invest when it can be demonstrated that the investment adds to the value of the firm; this is known as a *accretive investment*.

The cost approach provides a physically oriented estimate of value. The difficulty in applying this technique is making the proper adjustments for obsolescence and depreciation. These adjustments require judgment in three areas: the amount of physical, economic, and functional obsolescence. For instance, it is easy to identify that a given location has problems, but it is difficult to quantify the impact of these problems on the property's value. Due to the difficulties in applying these adjustments/this technique has not been included in this chapter.

The sales comparison approach, properly applied to homogenous properties -in thickly traded markets such as single-family homes, is a sound tool for gauging value based on actual market transactions. The difficulties in applying the technique to income-property markets include the paucity of sales, obtaining sales that are truly comparable to the subject, and making accurate adjustments. The most effective use of this tool is establishing a reasonable range of value, based on actual sales transactions.

The income approaches evolve from two different manners of thinking. The "cap-rate" techniques—band of investment, market-derived capitalization, and EVA—are single-period models that implicitly account for growth in income. The "yield" or "discount-rate" technique—the hotel valuation formula—(both before and after tax) is a multi-period model using explicitly calculated cash flows over a holding period to arrive at value. Each set has its strengths. The cap-rate models are easy to implement and easy to understand, while the yield-based model is not. On the other hand, with high-quality input data, yield-based models produce more accurate valuations than cap-rate models. It is important to support all of the income approaches using the best available data. It is difficult in many cases to determine the returns required by equity participants. *Market-value* models must be supported by the

analyst's reasonable expectations of investor behavior and a thorough understanding of market conditions. Firm- or investor-specific data' is available for the *investment value* models, and thus the parameters used in these models are easy to support.

Market participants should select the most appropriate models for their own use. Use of a variety of methods is encouraged. For instance, a potential seller would not only wish to know market value, but also buyer-specific valuations, such as the value to a specific public company or to partnerships. In this case/ a classic "three-approaches" appraisal plus the EVA and after-tax SVF are the appropriate models; these produce a most-likely value via appraisal as well as establish estimates of bids by potential buyers.

Endnotes

1. Market value is defined as "The most probable price that a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. From *Uniform Standards of Professional Appraisal Practice* (Appraisal Foundation, 1997).
2. Investment value is defined as "... the value of an investment to a particular investor based on his or her investment requirements." From *The Appraisal of Real Estate*, 11th Ed. (The Appraisal Institute, 1996), p. 26.
3. Rushmore, Stephen, and Eric Baum. *Hotels and Motels: Valuations and Market Studies* (Chicago, fl.: The Appraisal Institute, 2001), p. 356.
4. Rushmore and Baum, *Hotels and Motels*.
5. Rushmore and Baum, *Hotels and Motels*.
6. For further information, see Rubin, Karen, "Hotel and Real Estate Tax Valuation: Current Issues, *Real Estate finance*, Fall 1998.
7. The 2006 (year 3) net income of \$4.357 million, discounted for two years at 3 percent, equals \$4,106,890 or \$4.107 million, when expressed as 2004 dollars. The year 3 projection, with an occupancy of 71 percent is estimated to represent a stabilized operation.
8. Value based on a debt coverage ratio will be discussed separately.
9. Based on monthly amortization.
10. For an extended discussion, see Corgel, John B., and Jan A. deRoos, "The ADR Rule-of-Thumb as a Predictor of Lodging Property Values," *International Journal of Hospitality Management*, Vol. 12, No. 4, Winter 1993, pp. 353-365.
11. Corgel and deRoos, "The ADR Rule-of-Thumb."
12. The 2006 ADR of \$182.09 discounted for two years at the 3 percent inflation rate equals \$171.64 in 2004 dollars.
13. Mellen, Suzanne R., MAI. "Simultaneous Valuation: A New Technique," *Appraisal Journal*, April, 1983.
14. The calculation is made using a monthly interest rate (8.75% + 12 in this case) and the number of months in the respective terms (300-month amortization term, 120-month projection period).
15. deRoos, J. A., and Stephen Rushmore, "Lodging Property Valuation Models: The Effects of Taxes and Alternative Lender Criteria," *The Cornell Hotel and Restaurant Administration Quarterly*, December 1995, pp. 62-69.
16. Readers who would like more information about how the after-tax investment model works with a spreadsheet should contact Professor deRoos at: Cornell University, School of Hotel Administration, 435 Statler Hall, Ithaca, NY 14853-6902.
17. Note that this definition differs from a traditional accounting definition of earnings, which would deduct depreciation. However, the net income definition used in this chapter has a deduction for the CapEx reserve, which is the true economic measure of the costs necessary to maintain the FF&E, whereas depreciation is an approximation, driven by the tax code. Hence, we believe that the CapEx reserve is an improvement over the traditional FF&E depreciation deduction. Note that we have deducted *building* depreciation to determine A-T earnings.
18. There are many ways to derive a firm's WACC in the context of the EVA paradigm. Any of these can be substituted for the WACC derivation presented in this chapter.
19. For an expanded discussion, see Fisher, Jeffrey D., and Robert S. Martin, *Income Property Valuation* (Chicago, DL.: Dearborn Financial Publishing, 1994), chapter 6.
20. It is extraordinarily difficult to distinguish between excess cash flows due to *superior management* and excess cash flows due to *superior real estate* such as a location advantage or an *exceptional facility*. This opens a real debate as to whether to attribute the excess cash flow to real property or to intangible personal property.
21. The 2006 (year 3) CapEx reserve of \$652,000, discounted for two years at 3 percent equals approximately \$615,000.